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British Standards Association
Report

No. 65—1914.

British Engineering Standards Association.

(*Incorporated 1918.*)

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE

BY

THE INSTITUTION OF CIVIL ENGINEERS.
THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

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BRITISH
STANDARD SPECIFICATION
FOR
SALT-GLAZED WARE PIPES.

LONDON:
PUBLISHED FOR THE ASSOCIATION BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, E.C. 4; AND 5, BROADWAY, WESTMINSTER, S.W. 1;
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June, 1918.

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No. 65—1914.

BRITISH ENGINEERING STANDARDS ASSOCIATION.

MAIN COMMITTEE.

† SIR ARCHIBALD DENNY, BART. (*Chairman*).

SIR MAURICE FITZMAURICE, C.M.G. (*Vice-Chairman*).

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COL. R. E. CROMPTON, C.B.	Nominated by the Institution of Electrical Engineers.
SIR JOHN SNELL	
MR. C. P. SPARKS	
MR. F. R. DAVENPORT	Co-opted by the nominated members to represent the Federation of British Industries.
MR. F. W. GILBERTSON	
HON. SIR CHARLES PARSONS, K.C.B.	Co-opted by the nominated members.
SIR ROBERT HADFIELD, BART.	
SIR RICHARD GLAZEBROOK, C.B.	

DR. J. H. T. TUDSBERY (*Hon. Secretary*).

MR. C. LE MAISTRE (*Secretary*).

MR. CHARLES DRESSER (*Assistant Secretary*).

---

† Succeeded the late SIR JOHN WOLFE BARRY, K.C.B., February, 1918.

BRITISH ENGINEERING STANDARDS ASSOCIATION.

The following is a list of the Members of the Sectional Committee on Vitrified Ware Pipes which was entrusted with the drafting of the British Standard Specification for Salt-Glazed Ware Pipes :—

SECTIONAL COMMITTEE ON VITRIFIED WARE PIPES.

August, 1914.

Chairman, Sir Maurice Fitzmaurice, C.M.G.
Vice-Chairman, Mr. T. Sims, C.B. (*Representing the Admiralty, Director of Works Department*).
War Office, Mr. W. C. Tyndale.
General Post Office, Mr. F. L. Henley.
Local Government Board, Mr. R. G. Hetherington.
Crown Agents for the Colonies, Mr. Ashton M. Heath ; Mr. R. H. H. Stanger.
London County Council, Mr. G. W. Humphreys.
Royal Institute of British Architects, Mr. Edwin T. Hall.
Institution of Municipal and County Engineers, Mr. J. Patten Barber ; Mr. E. J. Elford ; Mr. F. W. Pearce.
Royal Sanitary Institute, Mr. Henry Adams.
Institute of Sanitary Engineers, Mr. James Farley.
Surveyors' Institution, Mr. J. H. Hanson.
Institute of Chemistry, Mr. W. Thomason.
Society of Architects, Mr. B. R. Tucker.
Institute of Clayworkers, *Mr. H. R. Mansfield.
Dorset and Devon Stoneware Potters' Association, Mr. C. Sharp.
Midland Association of Sanitary Stoneware Manufacturers, Mr. J. Hassall ; Mr. R. Lawton ; Mr. C. E. Morris.
Northern Association of Sanitary Pipe Manufacturers, Mr. W. J. Elsworth.
North Wales Potters' Association, Mr. E. Lloyd Edwards.
Potters' Association, † Mr. J. Johnston Green ; Mr. W. Oates ; Colonel W. H. Place.
Southern Potters' Association, Mr. S. J. Stiff.

†Mr. W. Harpur (*City Engineer, Cardiff*) ; Mr. E. J. Lovegrove (*Borough Engineer, Hornsey*) ; Mr. H. Carter Pegg (*G. T. Hine and Carter Pegg*) ; Mr. H. A. Roechling (*Molesworth and Roechling*) ; Mr. G. Midgley Taylor (*J. Taylor & Sons and Santo Crimp*).

* Deceased February, 1914.

† Since deceased.

PREFACE.

The Sectional Committee on Vitrified Ware Pipes was appointed by the Main Committee on May 16th, 1911.

In drawing up their recommendations for Salt-Glazed Ware Pipes the Committee were able to avail themselves of the draft Standard Specification drawn up by the Standardisation Committee of the Institution of Municipal and County Engineers, and of a draft Specification, based upon the proposals of that Institution, which was subsequently submitted by the Pipe Manufacturers on the Sectional Committee as the result of a prolonged series of Conferences amongst the Manufacturers. The Committee desire to place on record their indebtedness both to the Institution of Municipal and County Engineers and to the Manufacturers for these drafts, which materially assisted them in drawing up the Standard Specification.

The question of putting forward a Standard form of Socket which would produce, in unskilled hands, better alignment than the form in most general use occupied the attention of the Committee for some considerable time, but in view of the importance to the industry of not materially increasing the cost of Salt-Glazed Ware Pipes, it was not found practicable to proceed with the matter at present, and only those dimensions of Sockets shown in Columns 3, 4, and 5 of the Table on page 13 were therefore dealt with.

This Report was adopted by the Sectional Committee on Vitrified Ware Pipes at their meeting on June 26th, 1914.

This Report was approved by the Main Committee at their meeting on July 16th, 1914.

MAURICE FITZMAURICE,

Chairman of Sectional Committee
on Vitrified Ware Pipes.

Note.—*The Association desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the material herein referred to, but does not purport to include all the necessary provisions of a Contract.*

BRITISH
STANDARD SPECIFICATION
FOR
SALT-GLAZED WARE PIPES.

Nomenclature and Definitions of Straight Pipes.

1. The Pipes manufactured in accordance with this Specification shall be known as British Standard Salt-Glazed Ware Pipes.

They shall be one of two Classes as may be specified, viz. :—

British Standard Pipes.
British Standard Tested Pipes.

British Standard Pipes :—British Standard Pipes are Pipes subject in every respect to the requirements of this Specification, but of which only a percentage (as provided for in Clause 11) are to be submitted to the Hydraulic Test specified in Clause 10.

British Standard Tested Pipes :—British Standard Tested Pipes are Pipes subject in every respect to the requirements of this Specification, and all of which have satisfactorily withstood the Hydraulic Test specified in Clause 10.

Thickness of Straight Pipes.

2. The barrels and the sockets of the Pipes shall be of not less than the minimum mean thicknesses shown in Columns 2 and 3 respectively of the Table on page 13, except as provided for in Clause 7.

Sockets.

3. The interior of the sockets shall be conical, having a taper of one-sixteenth of an inch, measured on the diameter per inch of length (*i.e.*, 1 in 32); thus the diameter of a socket 2 inches deep will be one-eighth of an inch greater at the top than at the bottom. The depth of the sockets shall be in accordance with the Table on page 13. The width of the shoulder of the socket of any individual pipe shall exceed the mean thickness of the barrel by not less than the figures given in column 5 of the Table on page 13. The mean thickness of the barrel of any individual pipe shall be ascertained by adding the measured least thickness to the greatest thickness and dividing the sum by two.

Length of Straight Pipes.

4. The Standard length of the barrels of Straight Pipes shall be as follows :—

Up to and including 6 ins. . 2 ft.
7 ins. to 10 ins. inclusive. . 2 ft. and 2 ft. 6 ins.
12 ins. to 36 ins. inclusive . 2 ft., 2 ft. 6 ins., and 3 ft.

as may be specified.

Grooving.

5. The interior of the sockets, and the exterior of the spigots for a length equal to 1½ times the depth of the sockets, shall be grooved, and the depth of such grooves shall be not less than one-sixteenth of an inch.

Glazing.

6. The glazing shall be obtained by the action of the fumes of volatilised common salt on the material of the Pipes during the process of burning. The glaze shall cover the interior and the exterior surface of the Pipes which will remain exposed after jointing.

Permissible Variation in Thickness.

7. Subject to the mean thickness of the barrel of a pipe being not less than that specified in column 2 of the Table on page 13, a variation in the thickness of the barrel at any two points not exceeding the figure given in the following Table is permissible :—

Diameter of Pipe.	Permissible Variation in Thickness.
Not exceeding 12 ins.	1/16 in.
13 to 18 ins. inclusive.	3/32 ,,
Above 18 ins. to 36 ins. inclusive.	1/8 ,,

The mean thickness of the barrel of any individual pipe shall be ascertained by adding the measured least thickness to the greatest thickness and dividing the sum by two.

Subject to the mean thickness of the socket of a pipe being not less than that specified in column 3 of the Table on page 13, a variation in thickness of the socket at any two points not exceeding the figure given in the following Table is permissible :—

Diameter of Pipe.	Permissible Variation in Thickness.
Not exceeding 12 ins.	1/16 in.
13 to 18 ins. inclusive.	3/32 ,,
Above 18 ins. to 36 ins. inclusive.	1/8 ,,

The mean thickness of the socket of any individual pipe shall be ascertained by adding the measured least thickness to the greatest thickness and dividing the sum by two.

Permissible Deviation from Standard Diameter.

8. The internal diameter of the barrel shall nowhere deviate from the Standard Internal diameter by more than the figure given in the following Table :--

Standard Internal Diameter of Pipe.	Permissible Deviation from Diameter.
3 and 4 ins.	1/8 in.
5 to 7 ..	3/16 ,,
8 and 9 ,,	1/4 ,,
10 to 14 ..	5/16 ,,
15 and 18 ,,	3/8 ,,
21 and 24 ,,	1/2 ,,
27 ..	3/4 ,,
30 and 36 .,	1 ,,

Permissible Deviation from Straightness.

9. The permissible limits of deviation from straightness of the barrels, measured on the inside of the curve, for all diameters of Pipe tested by means of a straight-edge shall be as follows:—

Length of Pipe.	Permissible Deviation from Straightness.
2 ft.	3/16 in.
2 ft. 6 ins.	1/4 ,,
3 ft.	5/16 ,,

Hydraulic Test.

10. The Pipes when subjected to the Hydraulic Test at the Manufacturer's works must withstand an internal hydraulic test pressure on the barrels of the Pipes of 20 lbs. per square inch without showing signs of injury or leakage. The pressure shall be applied at a rate not exceeding 10 lbs. per square inch in five seconds, and full pressure shall be maintained for at least five seconds. Care shall be taken that all air is extracted before the test is commenced.

The Purchaser, the Engineer,* and the Inspector† shall have the right to be present at the application of the tests.

Number of Hydraulic Tests.

11. *British Standard Pipes :*—Should the Engineer (or the Purchaser) so desire, 5 per cent. of the pipes ordered may be selected for testing under the hydraulic test at the Manufacturer's works.

If four-fifths of the pipes selected for testing comply with the hydraulic test the whole of the pipes represented (other than those which have failed) shall be accepted.

If less than four-fifths of the pipes first selected comply with the test a further 5 per cent. of the whole of the pipes represented shall be selected and so on, until the total number of pipes which stand the test amounts to four-fifths of the total number of pipes tested, when the whole of the pipes represented (other than those which have failed) shall be accepted, or failing this, until the whole of the pipes have been tested, when only such as comply with the test shall be accepted.

British Standard Tested Pipes :—All pipes marked "Tested" shall have been subjected to and have withstood the Hydraulic Test specified in Clause 10.

Absorption Test.

12. The test pieces selected for testing shall be taken from the body of the Pipe and not within six inches of the end. Each test piece shall be of the whole thickness of the Pipe, and shall have two glazed surfaces, each having an area of not less than 8 inches super nor more than 20 inches super. The test pieces shall be dried at a temperature of not less than 150° C. until no further loss of weight can be noted. They shall then be immersed in cold water, and the temperature raised to boiling point (100° C.). The water shall be maintained at that temperature for one hour, and after it has been allowed to cool, the test pieces shall be removed, carefully wiped with a dry cloth, and then re-weighed. The percentage increase in weight of each test piece by absorption of water shall not exceed the figures given in the following Table: —

---

* The word "Engineer" shall mean the Engineer, Architect or Surveyor acting in connection with the works for which the Pipes are required or for the Purchaser.

† The word "Inspector" shall mean any person expressly authorised in writing by the Engineer (or by the Purchaser) to perform the duties herein referred to or any of them.

Thickness of Pipe.	Percentage Increase in Weight.
¾ in. and under	5
Over ¾ in. and up to 1 in. ...	6
,, 1 ,, ,, 1½ ,, ...	8
,, 1½ ins.	10

Absorption Tests shall be carried out at the Manufacturer's works by the Engineer or the Inspector before the Pipes are despatched.

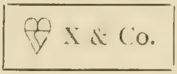
Number of Absorption Tests.

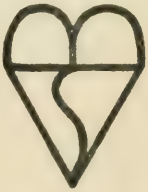
13. One Absorption Test may be made from every 100 Pipes ordered if the Engineer (or the Purchaser) so desires.

Marking.

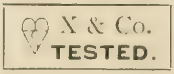
14. Every Pipe shall have legibly impressed upon it before firing the name or trade mark of the manufacturer.

British Standard Pipes:—Every finished Pipe which purports to have been made by the manufacturer in conformity with the terms of the British Standard Specification shall have stencilled upon it in indelible black the brand (see sketch), which shall be enclosed in a rectangle or other figure with the name or Trade Mark of the Manufacturer, *e.g.*





British Standard Tested Pipes:—Every finished Pipe which has satisfactorily withstood the Hydraulic Test prescribed in Clause 10 shall have stencilled upon it in indelible black the brand (see sketch) which shall be enclosed in a rectangle or other figure with the name or Trade Mark of the Manufacturer and the word "Tested" in letters not less than one inch high, *e.g.*



Testing Facilities.

15. The Manufacturer shall at his own expense supply the necessary gauges, and shall supply and prepare all test pieces and supply all labour and apparatus for testing which may be necessary or which may be required by the Engineer (or by the Purchaser) for carrying out the tests and requirements of this Specification at the Manufacturer's works. If the Manufacturer shall fail to perform the foregoing obligations or any of them, the Engineer (or the Purchaser) shall be at liberty to perform the said obligations or any of them which the Manufacturer has failed to perform, either at the Manufacturer's works or elsewhere, and charge the cost and expenses thereof to the Manufacturer.

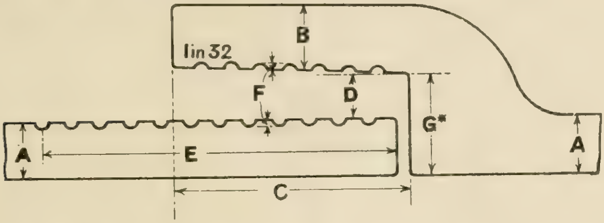
Non-Compliance with Tests and Requirements.

16. Should any pipe be found after delivery not to have been made in conformity with the foregoing tests and requirements of this Specification other than the hydraulic and absorption tests, such pipe may be rejected.

Arbitration.

17. In case any dispute shall arise between the parties to any contract in which this Specification is in whole or part incorporated as to whether any obligation, requirement, or test, referred to in this Specification has been performed, carried out and/or complied with, then such dispute shall be referred to the arbitration of a person to be agreed upon between the parties, or failing agreement, to be appointed, at the request of either party to the said dispute, by the Chairman for the time being of the Engineering Standards Committee, provided always that if such dispute is within the terms of any other agreement to refer or submit to arbitration, this clause shall be of no effect.

BRITISH STANDARD SALT-GLAZED WARE PIPES.



1	2	3	4	5	6	7
Int. Dia. of Pipe (see Clause 8).	Minimum Mean Thickness of Barrel (see Clause 7). **A**	Minimum Mean Thickness of Socket (see Clause 7). **B**	Minimum Internal Depth of Socket (see Clause 3). **C**	Minimum Jointing Space (see Clause 3). **D**	Length of Grooving on Spigot (see Clause 5). **E = 1½ C**	Minimum Depth of Grooving (see Clause 5). **F**
ins.	ins.	ins.	ins.	in.	ins.	in.
3	7/16	7/16	2	5/16	3	1/16
4	½	½	2	⅜	3	1/16
5	9/16	9/16	2¼	7/16	3⅜	1/16
6	⅝	⅝	2¼	7/16	3⅜	1/16
7	11/16	11/16	2¼	7/16	3⅜	1/16
8	11/16	11/16	2½	½	3¾	1/16
9	¾	¾	2½	½	3¾	1/16
10	13/16	13/16	2¾	⅝	4⅛	1/16
12	1	1	2¾	⅝	4⅛	1/16
13	1 1/16	1 1/16	3	⅝	4½	1/16
14	1 3/16	1 3/16	3	⅝	4½	1/16
15	1¼	1¼	3	⅝	4½	1/16
18	1½	1½	3	⅝	4½	1/16
21	1⅝	1⅝	3¼	¾	4⅞	1/16
24	1¾	1¾	3½	¾	5¼	1/16
27	1⅞	1⅞	3½	¾	5¼	1/16
30	2	2	3½	¾	5¼	1/16
36	2½	2½	3½	1	5¼	1/16

* **G** = Width of Shoulder of Socket which must exceed the mean thickness of the Barrel of the pipe ascertained as directed in Clause 3 by not less than the values for **D** given in column 5.

British Engineering Standards Association.

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OF
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NOVEMBER, 1918.

(*This List cancels all previous Lists.*)

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